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NETWORK-CENTRIC WARFARE: A MARINE CORPS NECESSITY
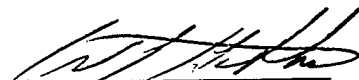
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A paper submitted to the faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Maritime Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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ABSTRACT

The Marine Corps' capstone concept for future warfare in the littoral regions of the world is Operational Maneuver from the Sea (OMFTS). OMFTS relies on three operational functions for its successful development: maneuver, fires, and logistics. To meet that requirement, the Marine Corps formulated three concepts to improve those functions: Ship-to-Objective Maneuver, Advanced Expeditionary Fire Support, and Seabased Logistics. However, those three concepts require a unique environment. The Navy has developed a concept that will provide that unique environment—Network-Centric Warfare (NCW). NCW will provide an environment where linked networks create a shared battlespace awareness from which commanders can self-synchronize efforts, enhancing the tempo and momentum of the battle. Where as the Marine Corps' concept focuses on capitalizing on the application of technologically advanced weapons, the Navy's concept aims to exploit advanced technology to create an advanced information environment within which combat force employment could be enhanced. Therefore, the two concepts are not only interdependent, but also reliant upon one other for their successful development. However, the Marine Corps has not yet formally adopted the Navy's concept. Therefore, the Marine Corps, because NCW will inevitably develop into a capability, along with the fact that it enables all future concepts, must accept NCW and cooperatively develop it with the Navy. The first step is to formally endorse the concept. Both services have demonstrated a desire to add value to concepts and doctrines through co-endorsing the documents. NCW must receive the same attention if the Marine Corps' capstone concept is to develop into a capability.

INTRODUCTION

With the increase in regional instability throughout the globe, the nation's military strategy requires that the services ensure a means to rapidly project power.[1] Uncertain as to where or what the threat may be, services must posses the capability to respond to any crisis that presents a threat to U.S. vital interests. The advent of advanced technological capabilities has encouraged all services to review their current warfighting doctrines and develop new concepts, exploiting the benefits of available technology. Focusing on the littoral regions of the world, the Marine Corps has formulated its capstone concept, Operational Maneuver from the Sea (OMFTS).[2]

The success of OMFTS is reliant on successful adaptation of three operational functions: maneuver, fire support, and logistics.[3] Consequently, the Marine Corps has developed supporting concepts that explain how these three functions will be refined to ensure successful employment of OMFTS.[4] When these three concepts are reviewed, their reliance on a real-time intelligence environment is clear. The U.S. Navy has unveiled its concept for the future, Network-Centric Warfare (NCW), envisioning an enhanced information environment. The Marine Corps has neither formally endorsed the Navy's NCW concept, nor any other such concept. However, it is evident that OMFTS requires the environment NCW produces; therefore the Marine Corps must ensure it works cooperatively with the Navy in NCW development. To illustrate this point, this paper will first provide general background information, followed by a discussion of NCW and OMFTS, and finally a detailed analysis of the three operational concepts supporting OMFTS demonstrating their reliance on the NCW environment for their success.

BACKGROUND

The Marine Corps' capstone concept for projecting power to meet world threats in the littoral regions of the world is OMFTS.[5] OMFTS was developed to capitalize on current Marine Corps warfighting doctrine.[6] In accordance with the National Military Strategy, it is critical that the United States maintain an ability to project power.[7] Increased value has been placed on controlling the littoral regions of the world. The littorals are populated by nearly 75% of the world's population, and contain over 80% of the world's capital cities.[8] These facts, combined with the reality that the littorals are the intersection of valuable trade routes, require the U.S. to ensure its ability to influence actions in the littoral regions of the world. In meeting the National Military Strategy, the Navy and Marine Corps published the White Papers, "...From the Sea" and "Forward...From the Sea." These papers provide the naval service with "a common vision for a future in which skillfully handled naval forces would enable the United States to exert its influence in the littoral regions of the world."[9] Founded from "Forward...from the Sea", the Marine Corps' concept, OMFTS, sets forth a vision for projecting power in the littorals, applying current warfighting doctrine. The Marine Corps' current amphibious doctrine focuses on terrain and requires the seizure of a beach from which an extensive build-up of combat resources can take place, until "subsequent operations ashore" could resume. However, this procedure is not in sync with the Marine Corps' overarching warfighting philosophy—Maneuver Warfare. OMFTS was developed on the realization that advance technology has expanded coastal defense capabilities and, therefore, requires a forcible entry capability that incorporates the maneuver warfare philosophy. Understanding that in war uncertainty will always exists, maneuver warfare asserts that the force that can successfully operate within the element of fog and friction will

have the decisive advantage. Maneuver warfare aims to accomplish this through three tenets: operational speed, operational flexibility, and applying strengths against an enemy's weakness. This calls for a detailed analysis of friendly and enemy capabilities to identify strengths, weaknesses, and critical vulnerabilities-- ensuring a commander can pit his strengths against enemy weaknesses. Further, by operating with greater speed, both through the decision-making process as well as over distance, a commander will gain and maintain the initiative and momentum, causing the enemy to be reactive vice pro-active.[10] Therefore, the current antiquated style of amphibious operations, coupled with the increased range and lethality of coastal defense capabilities spurred the Marine Corps to develop a new approach to littoral power projection. In so doing, the Marine Corps modeled the tenets of OMFTS after its overarching doctrinal way of fighting—maneuver warfare.[11] As such, the Marine Corps has a concept that satisfies the requirements of the National Military Strategy, ensures the ability to project power throughout the littorals, and capitalizes on the tenets of maneuver warfare.

NETWORK-CENTRIC WARFARE

The Navy's concept, NCW, aims to exploit an information network system that enables a shared battle space knowledge among commanders, allowing them to exercise rapid decision making, harmonized through commander's intent, to self-synchronize their efforts and increase the momentum of the battle to maintain the initiative.[12] Despite its name, NCW is more a description of a future warfighting environment rather than a concept based on combat resource applications. Therefore, NCW creates the medium in which other technologically advanced warfighting concepts can be enhanced. To create the desired environment, NCW aims to integrate three "entities" (sensors, actors and decision-makers).[13] The entities interact within the

information structure (infostructure) which is the medium through which information is shared. This infostructure links the sensors, actors and decision-makers, enabling them to interact, sharing information and providing direction.[14] A sensor is any entity that can contribute to improving the battle space knowledge, an actor entity provides the combat power and the decision-maker entity utilizes the information to allocate resources.[15] The objective of NCW is to provide widely dispersed forces the ability to act with real-time intelligence to mass effects upon the enemy through self-synchronization.[16] NCW aims to link "geographically dispersed forces to create a high level of shared battlespace awareness that can be exploited via self-synchronization and other network-centric operations to achieve commanders' intent."[17] Accessibility to the infostructure is required to ensure that forces, unified by clear commanders' intent, can maintain battlespace knowledge and in turn utilize initiative to capitalize on opportunities. The maintenance of battlespace knowledge is critical and one of the tenets of NCW, allowing commanders to self-synchronize their efforts to attain the specified objective. Furthermore, NCW will enhance commanders' ability to rapidly develop and implement plans regardless of geographic dispersion, thereby increasing the tempo and momentum of the battle. NCW allows for the issue of information, orders and direction through the infostructure (i.g. video telecommunication). This "virtual collaboration" will enable commanders to execute rapid decisions and maintain the momentum of the battle.[18]

Network-Centric Warfare capitalizes on multiple sensor entities, linked through an infostructure, to provide crucial awareness that decision-makers can exploit. This shared information can be translated into intelligence, providing forces with shared battlespace awareness. From this shared awareness, units can quickly adjust their actions based on friendly or enemy circumstances, to maintain the initiative. This capability will increase the speed with

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which decisions are made and executed, causing the enemy an inability to effectively react and consequently "locking out" any opportunity for him to employ successful courses of action.[19]

OPERATIONAL MANEUVER FROM THE SEA (OMFTS)

The success of OMFTS requires the effective application of three crucial operational functions: operational maneuver, operational fires, and operational logistics. Although there are many operational functions that support OMFTS, these three are viewed as most valuable and therefore addressed in this paper. OMFTS is unique because it aims to use the sea as a maneuver space to gain a decisive advantage from which to attack the enemy, requiring a "maneuver of naval forces at the operational level…that aims at exploiting a significant enemy weakness in order to deal a decisive blow."[20] The tenets of OMFTS call for focusing on operational objectives, utilizing the sea as maneuver space, generating overwhelming tempo and momentum by applying strengths against weaknesses, and emphasizing intelligence, deception and flexibility.[21] In current operations, a naval force moves into an amphibious operations area and conducts extensive offloading of amphibious forces and supplies. Consequently, the force yields flexibility, maneuver, and surprise, while becoming vulnerable to coastal defenses. OMFTS seeks to capitalize on new technological advances in mobility, precision munitions, and advanced communications to identify enemy weaknesses in defenses, rapidly maneuver to capitalize on those weakness and strike swiftly with massed assets to quickly seize the operational objective. No longer will amphibious operations focus first on seizing terrain to allow a build-up of combat support services prior to commencing the attack on enemy decisive points.[22] This procedure presented significant lucrative targets to the enemy (fuel and ammunition dumps, ships anchored close to shore in preparation for off-loading cargo, and

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crowded assembly areas of forming troops.) OMFTS will exploit the identification of enemy weaknesses through operational maneuver, supported by operational fires and logistics, to surprise, overwhelm and defeat the enemy. The Marine Corps asserts that for OMFTS to fully develop a networked command and control system must be the foundation, thus enabling a successful application of operational functions. The "command and control system oriented towards rapid decision-making at all levels of command, [and] the additional speed and flexibility offered by these new technologies translates into a high tempo of operations. Vulnerabilities can be exploited before they are reduced; opportunities seized before they vanish, and traps sprung before they are discovered. In short, we will be able to act so quickly that the enemy will not be able to react effectively until it is too late."[23]

To illustrate the application of the OMFTS concept, and demonstrate its reliance on the cited three operational functions, the Marine Corps' OMFTS scenario will be examined. Envision a Naval Expeditionary Force (NEF) executing an attack originating from Spain onto the coast of North America without requiring an intermediate base. The NEF departs Spain and while in transit west, obtains real-time intelligence identifying the enemy's weaknesses. In the beginning of the transit, the force is prepared to strike anywhere along the coast, and as intelligence is gathered, three sites are selected as potential Littoral Penetration Areas (LPA): LPA Jersey, LPA Richmond, and LPA Charleston.[24] This allows the NEF to expand the battlespace by posing a threat throughout a large region, maintaining flexibility and initiative. Consequently the enemy, not able to identify the location of the force or its intentions, is forced to defend everywhere, a clear weakness. Or, conversely, the enemy must select specific areas to defend, creating gaps in his defense, another obvious weakness.[25] The NEF would be dispersed throughout the ocean, preparing to mass effects at the specified time and place, presenting

ambiguity as to its intentions while responding to real-time intelligence. In this scenario, intelligence identifies an enemy weakness in coastal defenses and "pulls" the NEF to strike through LPA Richmond.[26] The information environment capitalizes on advanced technology in mobility to enable the assault force to seamlessly transition from sea to shore to attack the inland operational objective.

For OMFTS to maintain the required momentum for success, responsive fire support and logistical support massed from sea bases will be required. OMFTS requires the maneuvering of forces to a position of advantage over the enemy through real-time intelligence and a command and control system capable of coordinating rapid adjustments of forces. Additionally, responsive fire support is critical to ensuring maneuver elements maintain tempo and initiative through a capability that allows them to quickly neutralize enemy resistance during the maneuver to the objective. As forces close with the shore and during their maneuver inland, they must have the ability to employ combined arms to facilitate their maneuver.[27] In addition, through the seabasing of logistics efforts, the landing force will avoid the laborious and vulnerable "build-up" phase. The maneuver forces will transition from sea to shore seamlessly and continue inland to the objective. Therefore, a timely, responsive and accurate logistic support capability must be present to ensure the continuous sustainment of the landing force.[28]

In summary, OMFTS will use all options provided by control of the seas by capitalizing on the integration of naval forces, rapid mobility, lethal precise fires and seabased sustainment, all of which are enabled by a command and control system allowing for real-time information. In order for these three functions to meet the requirements established in OMFTS, a "system must provide units with control over the information they need...[transitioning] from communication nets to information networks."[29] The three supporting concepts developed to

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support OMFTS are: Ship-to-Objective Maneuver, Expeditionary Fire Support and Sea-Based Logistics. These concepts are critical to the success of OMFTS, as they present in detail the required capabilities necessary to ensure the successful development of OMFTS.

SHIP-TO-OBJECTIVE MANEUVER

The operational concept Ship-to-Objective Maneuver (STOM) outlines the techniques, tactics and procedures necessary to accomplish operational maneuver for OMFTS, its tenets being: a shared real-time intelligence capability to identify or create vulnerabilities, the ability to enhance and exploit maneuver; and the ability to mass effects from widely dispersed shipping.[30] In STOM, the objective is to leverage technology to capitalize on enhanced mobility and flexibility. To facilitate maneuver, the fundamental requirement for STOM is the "command and control system [that] will provide the commander with the ability to see and influence the battlefield, while giving subordinate maneuver commanders the freedom to exploit fleeting opportunities. Plans will be based on accurate intelligence, but an understanding of the commander's intent will permit maneuver unit commanders to adapt their actions to the changing situation."[31] To demonstrate the necessity of this command and control system to provide real-time intelligence, the scenario of attacking North America will again be examined. As real-time intelligence pulled the NEF into LPA Richmond, identifying the area as an enemy vulnerability, the assault force would begin its maneuver from over the horizon to maintain surprise and ensure protection from coastal defenses. The LPA would be divided further into Littoral Penetration Zones (LPZ) that are further divided into Littoral Penetration Sites and Points (LPS/LPP).[32] As forces neared the beach, intelligence updates would provide commanders "the ability to independently navigate across the ocean surface to penetrate the

enemy's shoreline at points of their choosing."[33] Free from the constraints of securing a large beachhead, the commander will be able to focus on enemy critical vulnerabilities. The coupling of this command and control system, providing real-time intelligence, with the mobility provided through advanced technologies, enables the STOM concept. This will enable the NEF to apply its strengths against enemy weaknesses while ensuring tempo and momentum are capitalized, even after the surface assault has departed amphibious shipping.

In STOM, a NEF must have the capability to mass effects from widely dispersed shipping.[34] The future environment must provide a shared battlespace awareness to enable the coordination of vertical maneuver of forces with simultaneous surface assaults, which is an essential tenet to STOM. Vertical assaults will strike deep inland, placing the enemy in a dilemma as he is faced with coordinated deep air, and surface assaults.[35] Accordingly, commanders on all levels must have the capability to coordinate and synchronize their efforts throughout the assault, (envision if a surface assault commander had to adjust his route or was re-tasked while in route, seizing a different location based on real-time intelligence, while concurrently, a vertical assault was in progress to support the surface assault.) An environment must enable close and continuous coordination of forces if operational maneuver from over the horizon is to be accomplished.

Network-Centric Warfare will provide STOM with the environment that it requires by providing real-time intelligence for a shared battlespace awareness, enabling commanders to self-synchronize efforts from dispersed shipping, and enabling maneuver modifications to compensate for current enemy situations. The infostructure of NCW is specifically designed to provide the shared awareness that STOM requires. Currently, different organizations own their own intelligence gathering capabilities and those organizations rely primarily on their organic

assets available within their organization. NCW calls for linking various "Common Operating Pictures" to create the infostructure.[36] Furthermore, sensor entities will be all assets that can provide information to the infostructure, not simply intelligence gathering assets. Therefore, the amount of sensors on the battlefield will be significantly increased, providing information that, when combined with other data, presents an environment of increased awareness of friendly and enemy capabilities and intentions. Consequently, the greater the number of sensors, the greater the capability to gather information from which intelligence can be developed and disseminated. By possessing this linked infostructure, STOM will have the networked environment necessary to provide the real-time intelligence commanders need. Thereby, increasing the commander's speed of command, turning superior information into a marked advantage over the enemy. Through shared battlespace awareness, commanders will rapidly seize current information and be able to adjust their plans, objectives, or routes at any time to ensure a decisive blow on an operational objective—one of the critical requirements for STOM. Furthermore, the shared awareness will facilitate the self-synchronization of forces.[37] Unit leaders, guided by the commander's intent and focused by unity of effort, will exploit the NCW environment to capitalize on real-time intelligence to increase tempo and maintain the initiative. Consequently, the enemy's inability to cope with the high rate of operations causes his "lock-out" from effectively developing opposing courses of action.[38] Finally, the NCW environment will enable forces from widely dispersed platforms to mass their effects on the objective. Traditionally, the greater the dispersion of forces the less effective they become due to the repetitive loss of initiative and momentum that comes from operational pauses in support of planning or sustainment operations.[39] NCW aims to develop an environment that "[masses] effects of geographically dispersed air, ground, and sea-based shooters in a more responsive, accurate, and

lethal manner."[40] By commanders possessing a shared awareness, they will have the ability to trace the advance and intentions of adjacent forces and consequently be capable of executing coordinated assaults. The environment, provided by linking sensors with actors and decision-makers, would enhance the three tenets necessary to make STOM a success—an infostructure capable of providing real-time intelligence, flexible maneuver and synergistic massed effects from dispersed shipping.

ADVANCED EXPEDITIONARY FIRE SUPPORT

The Advanced Expeditionary Fire Support concept relies on three tenets to ensure OMFTS is fully supported: an environment of shared awareness; total fire support asset visibility; and rapid target acquisition. "In OMFTS...the naval expeditionary force will use fires to surprise the enemy and create favorable conditions for employment of the landing force. This requires the integrated efforts of all elements of the [NEF] and particularly depends on aviation and naval surface fires" to shape the battlefield.[41] To accomplish this, the commander needs visibility of all available fire support in order to accurately and rapidly engage high value targets. Consequently, forces that are rapidly maneuvering to exploit an enemy vulnerability will maintain the initiative and momentum through effective, responsive fire support. In accomplishing this, Expeditionary Fire Support relies on its first tenet, a command and control system that "encompasses all elements of the naval force and is compatible with on scene or arriving joint forces."[42] This system will "provide the means for sharing information to create a common tactical picture; selecting weapons systems to engage targets; controlling fire support; and coordinating fires..."[43] This command and control system will "provide shared situational awareness to all MAGTF elements through a common picture of the battlefield. Links to

national, theater and tactical reconnaissance, surveillance, and intelligence systems will continuously update this tactical picture and provide target acquisition support."[44]

Shared situational awareness will facilitate the remaining two tenets of Expeditionary Fires: total asset visibility and rapid target acquisition. With a command and control system providing a shared awareness, fire support will be responsive to the commander. As maneuver elements strike at enemy vulnerabilities, responsive fires will be critical to ensuring economy of force, mass, momentum and initiative. The command and control system, "will provide integrated information, including both targets and engagement options, in near real-time from strategic, operational, and tactical surveillance and reconnaissance systems. It will disseminate this information to all components of the naval expeditionary force and present leaders at all levels with a common and up-to-date picture of the battlespace."[45] This system will facilitate responsiveness by providing total fire support asset visibility, "[permitting] commanders to direct fires on the basis of the tactical situation, firing system availability and response time, [and] munitions availability."[46] A rapid target acquisition capability complements the capability of asset visibility to provide ground forces the ability to locate and destroy high value enemy targets. This system "must track [both] friendly maneuver elements and fire support systems, as well as detect those of the enemy. When friendly ground forces are engaged by enemy indirect fires, the target acquisition system will exploit aviation, ground, and seabased radar to coordinate counterbattery fires."[47] Once again, the command and control system is the medium expected to create the environment necessary to accomplish these tenets. "One of the cornerstones of the advanced expeditionary fire support C2 system is an integrated target acquisition capability able to support early battlespace shaping operations. Ground forces require assistance in locating targets....[therefore] the target acquisition system must be tied tightly into the C2 system."[48]

Network-Centric Warfare's accessible infostructure, that enables a shared battlespace awareness and self-synchronization, will create the environment the Advanced Fires concept requires for success. The Advanced Fires concept requires a C2 system that links all participants. NCW specifically calls for an infostructure that eliminates stovepipe systems and instead develops an environment of networked systems. This networked system supports the Advanced Fires concept by providing the requisite shared battlespace awareness to coordinate responsive fires. "Networking...provides the force with the capability to generate shared awareness with increased quality...this increased awareness can be exploited, [enabling] cooperative execution and self-synchronization."[49] Furthermore, NCW's infostructure will provide the commander with fire support asset visibility, enabling the responsive fires necessary to support high tempo mobility. "NCW is all about deriving combat power from distributed interacting with significantly improved access to information."[50] Capitalizing on this infostructure and shared awareness, commanders will maintain awareness of fire support asset locations, ordnance loads, fuel status, and response capability for the mission. This knowledge will enable fire support coordinators to rapidly select and task the most capable asset available, providing the commander with responsive fires and massed effects. This environment will not only enhance the momentum of the battle but will also be a "value creation" capability.[51] Through quickly identifying enemy high value targets while simultaneously tasking the most effective, available and responsive fire support platform, commanders can "create" opportunities to strike critical enemy targets, that in the past have been fleeting, missed opportunities.[52] This will increase the tempo of operations beyond that which the enemy can maintain a defense. Hence, with the network of sensors providing an infostructure with real-time intelligence, an environment is created where all participants can exploit the shared awareness of the battle. Fire

support elements will be able to execute the Advanced Fire Support concept in this environment, providing responsive fires to commanders who have total visibility of resources at their disposal. The integration of NCW and Advanced Expeditionary Fire Support will capitalize on one of NCW's principle tenets, "the ability...to share information across functional areas [to] enable resource allocation decisions to be made that maximize value."[53]

SEABASED LOGISTICS

The Seabased Logistics concept paper outlines the future capabilities and requirements for operational logistics in support of OMFTS, relying on a networked environment to ensure total asset visibility and rapid response to requests in order to ensure efficiency, and right time, right place, right item support. To support OMFTS, the logistics support procedures must ensure the speed, initiative and momentum of the landing force is maintained. Therefore, the Seabased Logistics concept calls for providing most, if not all, logistical support from sea bases. By accomplishing this, there would no longer be a need for landing forces to halt at the beach, lose momentum and begin a "build-up" phase prior to operations ashore. Furthermore, personnel would be more efficiently employed, since requirements for maintaining secure extensive lines of communication or a large logistics base ashore would be eliminated. Also, the NEF would be less vulnerable to the loss of high value targets since large storage of fuel, ordnance, or sustainment supplies would be at sea vice massed ashore. By "adopting best commercial practices, the functions of logistics will undergo a transformation to replace mass with information and speed."[54] An increased level of awareness will ensure that logistic planners are able to focus efforts, thereby increasing efficiency and response time to requests. To meet the requirement of information and speed, Seabased Logistic will rely on a networked system that

provides logistic planners with the critical information necessary to ensure proactive support operations. To accomplish this, Seabased Logistics will rely on "network based information technologies [to] enhance materiel distribution within tighter delivery schedules."[55] This network system must be able to integrate with theater logistics systems to capitalize on the value of a shared awareness of sustainment assets, theater wide, having a reach back capability to the continental United States for increased response time to requirements.

This environment will enable a shared awareness of forces' sustainment status, allowing logistic planners to use "real-time monitoring of ordnance, fuel, and supply consumption [to] forecast demand and facilitate preparations for pre-planned resupply operations."[56] The networked system will ensure responsive logistical support by: anticipating requirements to ensure re-supply efforts are in concert with landing forces' maneuver; distributing critically short assets to the force most in need and with the highest priority; and ensuring only the necessary supplies are delivered. As the concept paper asserts, "instead of vast quantities of materiel (much of which may be of little use) being pushed forward, end-users will communicate consumption data that will pull tailored support to maneuver units."[57] The networked environment must also provide the landing force with total asset visibility. "Enhanced knowledge of in-transit inventories through total asset visibility, will refine allocation of transportation resources, improve item availability and increase velocity of materiel movement through the system. This will allow lower inventory levels of inventory and better sustainment response."[58] Through a networked system that provides battlefield awareness, the landing force will enjoy a more responsive combat service support arm that anticipates requirements and responds at the critical time to ensure the momentum is maintained, capitalizing on total asset visibility to locate, track and deliver critical logistics requirements.

NCW's environment, created through an information system, provides the shared awareness of forces' sustainment status, total asset visibility and responsive support operations Seabased Logistics is reliant upon for success. The fundamental element of NCW is the interrelationship between all sensors, actors and decision-makers. The infostructure and shared awareness enhances Seabased Logistics activities. The sensors involved will not only provide enemy information, but also critical sustainment information commanders require for operational planning. "In order to achieve battlefield awareness...we need to move beyond information that tells us where things are and provide information about their identities. It is also necessary to know something about current operational status and capabilities."[59] Therefore, NCW envisions an environment where "information, such as fuel remaining and weapons loading, [by] using embedded sensors that track consumption of fuel and ordnance."[60] Consequently, the infostructure that NCW builds through its sensors will provide a shared battlefield awareness that all decision-makers can exploit to self-synchronize efforts in accomplishing the commander's intent, including logistic planners. Logistic planners will have the information network that creates the necessary environment to know the forces' sustainment status. Furthermore, the network will be linked throughout the theater of war with "reach-back" capabilities to the continental United States (CONUS), enabling that "total asset visibility" requirement. By linking suppliers throughout the distribution chain into the network, responsiveness will be enhanced through suppliers' ability to "optimally control production and distribution, as well as manage their individual supply chains."[61] Therefore, not only will operational logisticians be able to manage resupply operations with real-time status information, but strategic and CONUS sustainment providers will also be able to anticipate requirements and become involved in the synchronization of efforts. Finally, NCW provides all commanders the capability of "virtual

collaboration."[62] In the NCW environment, logistic planners on all levels of war will provide the commander with valuable advice and gain critical insight into operational requirements, significantly enhancing the operational function of logistics.

CONCLUSION

Operational Maneuver from the Sea is the Marine Corps' capstone concept for projecting power throughout the littorals. After reviewing the OMFTS concept, three critical operational functions must be achieved to ensure success: operational maneuver, operational fires, and operational logistics. In response to this requirement, the Marine Corps published three concept papers outlining the procedures for accomplishing those functions. After reviewing each concept, one observes that each concept's success relies on the accomplishment of unique tenets, and NCW provides a viable environment where these tenets can flourish. Network-Centric Warfare aims to create an environment where units can self-synchronize their efforts to increase the tempo and momentum of a battle, thereby "locking out" the enemy's ability to develop competitive courses of action. To accomplish this, NCW relies on employing sensors to allow actors and decision makers the ability to gain and maintain a shared battlespace awareness from which synchronization can be accomplished. Because NCW creates the environment that must be present for OMFTS to succeed, NCW essentially is the breath of life of OMFTS and its supporting concepts. One could assert that OMFTS does not require NCW but any network environment providing the same capabilities. However, the NCW concept is in existence, being developed by the Navy, and "it is important to recognize that NCW is inevitable in some form, whether it comes under the rubric of 'NCW' or not."[63] Also, both the Marine Corps concepts and NCW proclaim the requirement for interoperability of the "network." Furthermore, Joint

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Vision 2010 proclaims that "a more seamless integration of service capabilities" must be accomplished and "to achieve this integration...we must be fully joint: institutionally, organizationally, intellectually, and technically."[64] It is evident that despite the Marine Corps' failure to formally advocate NCW, its concepts require NCW and demonstrates the Marine Corps' desire for that environment. Essentially, the Marine Corps and Navy are on separate but convergent approaches to the same future environment. The difference is the Marine Corps is developing combat force employment concepts to exploit such an environment, while the Navy is conceptualizing how to create the environment in which other services could employ applications of power. The danger lies in the possibility that if either service loses focus on the inter-dependency of the two concepts, the final products will not be as complementary as needed. Therefore, since NCW is already in development and will further evolve, coupled with the fact that service "integration" of capabilities is required, the Marine Corps must become involved in the Navy's proposal of NCW. The Marine Corps and Navy have demonstrated the value and impact of co-signing documents. The Navy has co-signed the Marine Corps' concept papers Seabased Logistics and Mine Counter-Measures, and the Marine Corps has signed the Navy's Naval Doctrinal Publication 1: Naval Warfare. Further, both services have joined to endorse "Forward...from the Sea." This trend demonstrates that both services use the co-signing of documents to provide added value to the document. Hence, the absence of the Marine Corps' signature on the Navy NCW concept indicates they have not yet recognized the significant interdependence of OMFTS and NCW. Therefore, since the Marine Corps is committed to developing OMFTS, the next step must be to not only recognize NCW but also cooperatively develop it with the Navy.

NOTES

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[3] Ibid., 6.

[4] U.S. Marine Corps, Marine Corps Concept Paper: Advanced Expeditionary Fire Support (MCCP: Advanced Expeditionary Fire Support) (Washington, D.C.: January 20, 1998) 2; U.S. Marine Corps, Marine Corps Concept Paper: Ship-to-Objective Maneuver (MCCP: Ship to Objective Maneuver) (Washington, D.C.: July 25, 1997) 2.

[5] U.S. Marine Corps, MCCP: Ship to Objective Maneuver, 1.

[6] U. S. Marine Corps, MCCP:1, 2.

[7] Chairman of the Joint Chiefs of Staff, National Military Strategy, 20.

[8] U.S. Marine Corps, MCCP: 1, 3.

[9] Ibid., 1.

[10] U. S. Marine Corps, Marine Corps Doctrinal Publication: 1 Warfighting (MCDP 1: Warfighting) (Washington, D.C.: March 6, 1989)

[11] U. S. Marine Corps, MCCP: Ship to Objective Maneuver, 1-2

[12] Arthur K. Cebrowski, "Network-Centric Warfare: Its Origins and Future," Proceedings, January 1998, 31-32.

[13] David Alberts and others, Network-Centric Warfare: Developing and Leveraging Information Superiority, 2d ed. (Revised) (CCRP Publications, n.p., 1999), 93-95.

[14] Ibid., 35.

[15] Ibid., 116.

[16] Ibid., 93-94.

[17] Ibid., 89.

[18] Ibid., 108.

[19] Cebrowski, 31.

[20] U. S. Marine Corps, MCCP:1, 6.

[21] Ibid., 7.

[22] Ibid., 6.

[23] Ibid., 7.

[24] Ibid., 8-9.

[25] U. S. Marine Corps, MCCP: Ship to Objective Maneuver, 6.

[26] U. S. Marine Corps, MCCP:1, 9.

[27] Ibid., 12

[28] Ibid., 9.

[29] Ibid., 12.

[30] U.S. Marine Corps, MCCP: Ship to Objective Maneuver, 6-7.

[31] Ibid., 10.

[32] Ibid., 9.

[33] Ibid., 3.

[34] Ibid., 14.

[35] Ibid., 11.

[36] Alberts, 123-130.

[37] Ibid., 91-96.

[38] Cebrowski, 31.

[39] Alberts, 90.

[40] Joint Chiefs of Staff, J-6, "Information Paper: Observations on the Emergence of Network-Centric Warfare," (n.d. <http://www.dtic.mil/jcs/j6/education/warfare.html>) (December 27, 1999), 6.

[41] U. S. Marine Corps, MCCP: Advanced Expeditionary Fire Support, 3.

[42] Ibid., 4.

[43] Ibid.

[44] Ibid., 10.

[45] Ibid., 5.

[46] Ibid.

[47] Ibid.

[48] Ibid., 7.

[49] Alberts, 103.

[50] Ibid., 93

[51] Ibid., 29.

[52] Ibid., 55.

[53] Ibid., 38.

[54] U. S. Marine Corps, Marine Corps Concept Paper: Seabased Logistics, (Washington, D.C.: n.d.) 4.

[55] Ibid.

[56] Ibid., 9.

[57] Ibid., 5.

[58] Ibid.

[59] Alberts, 138.

[60] Ibid., 137.

[61] Ibid., 46.

[62] Ibid., 108-110.

[63] Center for Naval Analyses, Information Operations and Systems Division, Taking Forward the Navy's Network-Centric Warfare Concept: Final Report, CRM99-42 (Alexandria, VA: April 1999), 2.

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